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DIRECTORATE OF
INTELLIGENCE

Industrial Facilities
(Non-Military)

Basic Imagery Interpretation Report

Syzran Petroleum Refinery Stalin

Syzran, USSR

25X1

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RCS 13/0036/71
25X1
DATE JUNE 1971
COPY 117
PAGES 17

Next 1 Page(s) In Document Denied

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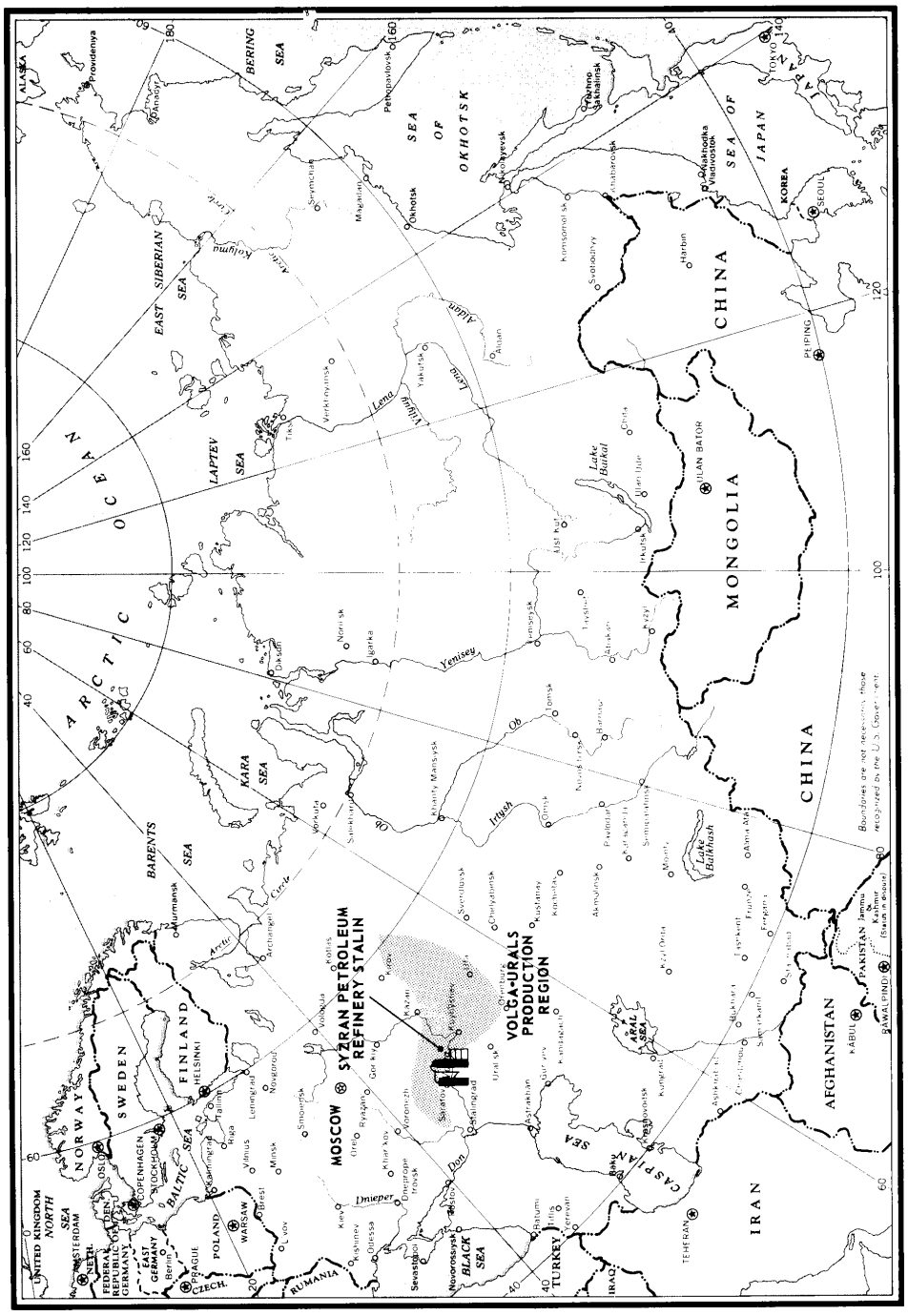

FIGURE 1. LOCATION MAP.

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INTRODUCTION

The Syzran Petroleum Refinery Stalin is located 5.5 nautical miles (nm) south-southwest of Syzran on the west bank of the Volga River (see Figure 1). The refinery ranks in the top 15 Soviet refineries with respect to annual charge capacity. Construction reportedly started in 1939-1940, and the original equipment was brought in from the evacuated Kherson and Odessa refineries. 1/ The refinery was placed in operation in 1942. 2/ A program of modernization and expansion of facilities started after World War II. 1/

Crude oil for this refinery is produced in the Syzran and Stavropol areas of the Volga-Urals Region. 1/ Crude oil is shipped to the refinery via pipeline and barges, and products are moved out by rail, barge, and pipeline. 2,3/ Rail service is provided by spurs from the Syzran-Saratov rail line.

Electric power is supplied by the Syzran Heat and Thermal Power Plant TETS [redacted] which is immediately south of the refinery. Power is distributed 25X1 to the various processing units through transformer substations within the refinery area. A sewage treatment plant which serves the refinery is located 1,100 feet to the north.

BASIC DESCRIPTION

Physical Features

The Syzran refinery occupies a nearly rectangular area which measures approximately 10,700 by 6,200 feet and contains about 1,500 acres (see Figures 2 and 3). The open reservoir and crude oil storage areas cover a third of the total area. The processing units and products and intermediate storage occupy about half of the total area. The newer units are widely spaced in conformity with the standard Soviet construction practices observed in various refineries throughout the country. The refinery is secured by a system of walls and fences.

Operational Functions

The main function of this refinery is the production of fuels. There are no lubricating oil production facilities present. The major refining equipment presently constructed and in operation includes crude oil distillation units, catalytic and thermal cracking units, an alkylation unit, and probable catalytic reforming-hydrotreating units (CR-HT). Also, there are gas fractionating and processing units, a sulfuric acid plant and several unidentified combination secondary processing units.

The products of this refinery include straight-run, cracked and blended gasolines, kerosene, diesel and fuel oils, gaseous hydrocarbons, and probably asphaltic materials.

Construction and Operational Status

The earliest photography used in this study is from December 1959. At that time, the following facilities were complete and in operation:

1. Four old-type crude oil distillation units
2. One new-type, standard crude oil distillation unit
3. One combination crude oil distillation and thermal cracking unit
4. Two thermal cracking units with associated gas processing facilities
5. Five desalting units
6. Most of the intermediates and products storage and about 30 percent of the crude oil storage
7. Most of the administration and support facilities and about 25 percent of the shipping facilities

Approved For Release 2008/05/29 : CIA-RDP79T00909A001000010024-9

Also, in December 1959 one Thermofor catalytic cracking unit was in the midstage of construction and a thermal cracking unit with a vapor recovery section and a crude oil distillation-desalting unit were in the very early stages of construction.

In February 1962, one new desalting unit and minor additions in the support and storage areas were completed. The alkylation unit, a gas fractionating and processing unit, and one probable CR-HT unit had been started.

By September 1963, the thermal and two catalytic cracking units, the probable CR-HT unit, and the gas fractionating and processing unit were completed. Gas storage tanks for the alkylation unit and additional tanks for products and crude oil had been constructed. An unidentified combination unit (Area N) was in mid-to-late stages of construction.

By mid-1964, the alkylation unit, an additional desalting unit, and new cooling facilities were completed, and construction started on the sulfuric acid plant. By late 1964, four of the oil storage reservoirs were completed and grading for a new unidentified combination unit (Area H3) was observed.

The unidentified combination unit (Area N) was completed by August 1965. In late 1965-early 1966 work began on the sewage treatment plant. By late 1966-early 1967, the crude oil distillation-desalting unit, the sulfuric acid plant, several cooling towers, and four large tanks and three reservoirs for crude oil storage were completed, and construction started on the second probable CR-HT unit. Late in 1967, the unidentified combination unit (Area H3) was completed and construction started on a second similar unit (Area H2).

No significant changes in facilities were noted during 1968. In early 1969, the second probable CR-HT unit was completed and work started on unidentified processing facilities in Area P5. By the end of 1969, the unidentified combination unit in Area H2 and the last of the crude oil storage tanks were completed and the loading facilities in the shipping area had been extended.

By February 1971, all major construction was completed and there was no evidence of additional expansion.

Facilities and Equipment

Table 1 lists the functional areas and the facilities and equipment in the refinery. All of the items listed are shown on Figure 3. Measurements are rounded to the nearest half-meter.

Table 1. Equipment and Facilities at the Syzran Petroleum Refinery Stalin

Area	Functional Description	Equipment and Facilities
A	Open Reservoir Storage	4 Support buildings 3 Cylindrical storage tanks 2 25.5-meter-diameter 1 9-meter-diameter 1 Cylindrical storage tank u/c, 9 meters in diameter 10 Open storage/treatment reservoirs (water) 15 Open storage reservoirs (water/possibly crude oil) 2 Open storage reservoirs (water)

Area	Functional Description	Equipment and Facilities
B	Crude Oil and Products Storage	11 Support buildings 2 Buildings u/c 48 Cylindrical storage tanks 1 39-meter-diameter 13 36-meter-diameter 8 [redacted] 25X1 20 4 2 3-meter-diameter 1 Semiburied cylindrical storage tank (not measured) 13 Horizontal storage tanks 11 [redacted] 25X1 2 12-meter-long 7 Covered storage reservoirs (including 4 earth covered), [redacted] 25X1 2 Covered storage reservoirs u/c, [redacted] 25X1 1 Excavation for reservoir 2 Small water basins (1 for blow-down)
C	Administration	10 Administration and support buildings
D	Maintenance, Storage, and Support	4 Engineering/shop buildings 9 Storage/support buildings 1 Cooling tower with 5 cells 1 Cylindrical storage tank, [redacted] 25X1 2 Semiburied storage tanks (not measured) 2 Horizontal settling/storage drums, [redacted] 25X1 2 Covered water storage reservoirs
E	Crude Oil Distillation (1) Desalting	3 Units, each with 3 treatment/mixing columns, 1 cluster of u/i equipment, 2 settling/desalting drums, 1 bank of heat exchangers/accumulators, 1 pump building, and 2 cylindrical chemical storage tanks 2 Support buildings 2 Horizontal storage/treatment tanks, [redacted] 25X1
	(2) Distillation and Desalting	1 Distillation unit with 1 row of 6 columns (1 vacuum, 1 topping, 1 atmospheric, 3 stripping/stabilizing columns), 2 probable stabilizing/absorbing columns, 4 banks of heat exchangers/accumulators, 2 pipe furnaces, 2 pump buildings, 1 process building, 1 control building, 1 support building, 1 probable treating building with 6 horizontal drums and 6 cylindrical storage tanks (3 meters in diameter), and 3 mixing columns

Area	Functional Description	Equipment and Facilities
E (Cont)		1 Desalting unit with 1 cluster of u/i equipment, 3 desalting spheres, 2 horizontal settling drums, 1 pump building, 2 support buildings, and 2 chemical storage tanks (not measured) 1 Transformer substation with 1 building 2 Support buildings
	(3) Distillation	1 Distillation unit with 1 row of 6 columns (1 vacuum, 1 topping, 1 atmospheric, 3 stabilizing/ stripping columns), 4 recycle columns, 4 banks of heat exchangers/accumulators, 2 pipe furnaces, 1 pump building, 1 treating building with 7 horizontal drums, and 3 cylindrical storage tanks, 3 meters in diameter 2 Cylindrical storage tanks, 3 meters in diameter 4 Support buildings
F	Catalytic Cracking (1) Intermediates/Products Storage	3 Support buildings 4 Cylindrical storage tanks, [redacted] 25X1
	(2) Unidentified Processing	1 Unit with 2 large-diameter processing columns 2 probable extractors 2 small banks of heat exchangers/accumulators 1 processing building with 2 horizontal drums 2 support buildings 2 horizontal storage tanks, 9 meters long
	(3) Catalytic Cracking	2 Thermofor catalytic cracking units, each with a reactor, regenerator and catalyst silo in scaffolding, 1 blower building with 3 blowers, 1 pipe furnace, 1 fractionator, 1 stripping column, 1 probable condenser building, 1 pump/compressor building, 1 air cooler, 1 vapor recovery column, 2 support buildings, 6 cylindrical tanks [redacted] four 25X1 3-meter-diameter), and 1 horizontal tank (9 meters long) 1 Gas fractionating unit with 3 columns, 1 process building, 2 compressor/pump buildings, 2 support buildings, 1 air cooler, 1 horizontal tank (12 meters long)

25X1

Area	Functional Description	Equipment and Facilities
G	Secondary Processing (1) Probable Catalytic Reforming-Hydrotreating	1 Probable catalytic reformer with 1 row of 4 reactors, 1 row of 3 columns (stabilizers/extractors), 1 cluster of u/i equipment, 1 possible separator column, 1 furnace, 1 bank of heat exchangers, 1 compressor building with 2 probable drying columns, 1 pump building and 3 support buildings 1 Probable hydrotreater with 1 row of 3 columns, 1 bank of u/i equipment, 1 probable drying column, 2 petrochemical-type furnaces, 1 compressor and pump building, 1 possible air cooler, and 1 horizontal tank (9 meters long) 1 Central control building
	(2) Probable Catalytic Reforming-Hydrotreating	1 Probable catalytic reformer with 1 row of 4 reactors, 1 row of 5 columns (stabilizers and extractors), 1 fractionator, 1 cluster of u/i equipment, 1 furnace, 1 bank of heat exchangers, 1 compressor building, 4 pump and control buildings, 5 horizontal storage/treatment drums (three [redacted] 25X1 1 Probable hydrotreater with 2 columns, 1 pipe furnace, 1 bank of heat exchangers, and 1 pump building
	(3) Intermediates/Products Storage	1 Control building 12 Cylindrical storage tanks 7 [redacted] 25X1 3 2
H	Secondary Processing (1) Probable Treating	1 Probable treating faccility with 2 mixing columns, 6 horizontal settling drums, 1 bank of heat exchangers, 1 pump building, 3 support buildings and 4 cylindrical storage/treating tanks (three [redacted] 25X1 3 Support buildings 1 Transformer substation with 1 building 6 Cylindrical storage tanks 4 15-meter-diameter 2 9-meter-diameter
	(2) Unidentified Combination	1 Double unit, each with 2 probable reactors, 1 pipe furnace, and 1 bank of heat exchangers; 1 pump building in common 1 Unit with 1 row of 3 columns, 2 pipe furnaces, 1 bank of heat exchangers, 1 pump building, 11 horizontal tanks (four 10.5-meter-long, and seven 9-meter-long) and 1 cylindrical storage tank [redacted] 25X1 25X1

[redacted] 25X1

25X1

Area	Functional Description	Equipment and Facilities
H (Cont)		1 Unit with 1 row of 5 columns, 2 probable drying columns, 1 bank of heat exchangers, 1 pump/ compressor building, and 1 horizontal tank (not measured)
	(3) Unidentified Combination	1 Double unit, each with 2 probable reactors, 1 pipe furnace, 1 bank of heat exchangers and 1 large compressor/pump building; 1 support building in common
		1 Unit with 2 possible fractionators, 2 possible stabilizers, 1 row of 4 possible extractors, 2 pipe furnaces, 1 pump building, 1 treatment building with 4 horizontal treatment drums, 2 support buildings, 2 cylindrical tanks [redacted] and 25X1 horizontal tanks/accumulators (not measured)
I	Water Cooling and Treating, and Waste Gas Disposal	15 Miscellaneous buildings
		17 Cooling towers,
		4 with 18 cells
		13 with 5 cells
		5 Cylindrical storage tanks
		4 12-meter-diameter
		1 6-meter-diameter
		5 Semiburied cylindrical tanks (not measured)
		7 horizontal tanks
		3 [redacted] 25X1
		4 9-meter-long
		1 Gasholder, [redacted] 25X1 meter
		1 Gasholder u/c
		9 Covered water reservoirs
		3 Open water reservoirs
		9 Storage basins
		5 Flares (outside of secured area)
J	Shipping and Receiving, Storage, Treating, and Packaging	1 Blending, treating and packing building with 11 blending tanks/ agitators
		1 Large packing and shipping building (being expanded)
		1 Probable blending and packing building and facilities u/c
		23 Support buildings
		2 Railcar loading racks
		17 Cylindrical storage tanks
		2 12-meter-diameter
		12 9-meter-diameter
		3 [redacted] 25X1
		42 Horizontal storage tanks
		6 [redacted] 25X1
		1 [redacted]
		15 15-meter-long
		18 12-meter-long
		2 [redacted] 25X1

25X1

K	Intermediates and Products Storage	1 Compressor building with 5 small attached columns or towers 16 Miscellaneous buildings 146 Cylindrical storage tanks 10 [redacted] 25X1 20 24-meter-diameter 4 15-meter-diameter 1 [redacted] 25X1 21 12-meter-diameter 22 [redacted] 25X1 2 9-meter-diameter 42 [redacted] 25X1 17 6-meter-diameter 7 [redacted] 25X1 42 Horizontal storage tanks 4 18-meter-long 4 15-meter-long 26 [redacted] 25X1 5 12-meter-long 1 [redacted] 25X1 2 9-meter-long 1 Water storage basin
L	Gas Fractionating and Processing	3 Groups of fractionators/extractors (2, 2, and 3 respectively), each with an associated process building or structure 1 Row of 3 possible driers/absorbers, 1 cluster of u/i equipment, 1 bank of heat exchangers, and 1 1 building or air cooler. 1 Compressor/pump building with at least 16 horizontal drums extruding and 1 associated cluster of u/i equipment 7 Support buildings 1 Horizontal storage tank, 24 meters long
M	Sulfuric Acid Alkylation	1 Row of 4 columns (deisobutanizer, debutanizer, depropanizer, and rerun) 1 Reactor building with 4 possible vertical reactors 1 Mixing and settler building with 8 horizontal drums 1 Process building 1 Compressor building 1 Pump building 1 Acid and caustic recovery building with 1 horizontal treatment drum and 3 short drying/separator columns 1 Air cooler 6 Cylindrical surge and rerun tanks 2 Acid storage tanks, horizontal, 18 meters long 1 Possible ammonia storage tank, horizontal, 9 meters long 23 Cylindrical storage tanks 6 12-meter-diameter 6 [redacted] 25X1 7 6-meter-diameter 4 [redacted] 25X1

25X1

Area	Functional Description	Equipment and Facilities
N	Unidentified Secondary Processing	1 Large combination unit with 1 possible process building with 6 attached processing columns, 2 banks of heat exchangers, 2 horizontal storage/settling tanks, 1 row of 7 columns and a process building with 1 column protruding through the roof, 1 row of 10 columns and 1 associated building with 3 accumulators on the roof and 1 probable fractionator, 4 pump/compressor buildings (one with 4 associated columns), 1 support building and 4 cylindrical storage/process tanks (not measured) 1 Unit with 4 columns, 1 cluster of u/i equipment, 1 bank of heat exchangers, 1 building and 2 small cylindrical tanks (not measured) 1 Unit with 2 columns, 1 furnace, 1 bank of heat exchangers, 4 support buildings, and 1 horizontal storage or treating drum (21 meters long) 2 Support buildings 4 Cylindrical storage tanks, 9 meters in diameter 12 Horizontal storage tanks 5 21-meter-long 7 [redacted] 25X1
O	Thermal Cracking	1 Cracking unit with 4 columns (2 reactors, 1 flasher and 1 fractionator), 2 pipe furnaces, 1 bank of heat exchangers, 1 air cooler, 1 pump building, 1 vapor recovery section with 2 columns and 1 process building, 1 small u/i column and 3 support buildings 1 Cracking unit with 4 columns, 2 pipe furnaces, 1 bank of heat exchangers, 1 separator column, 2 box-type coolers, 2 pump buildings, 1 vapor recovery section with 1 column and 1 building, 1 cluster of u/i equipment, 3 support buildings, 2 cylindrical tanks [redacted] 25X1 and 2 horizontal tanks (6 meters long) 1 Transformer substation with 1 building 4 Support buildings
P	Secondary Processing (1) Probable Gas Processing	1 Row of 3 process columns 1 Bank of u/i equipment 1 Compressor building with 3 attached drying columns 1 Support building 4 Cylindrical storage tanks, 12 meters in diameter 1 Gasholder, 15 meters in diameter

Area	Functional Description	Equipment and Facilities
	(2) Possible Construction/ Support	10 Small buildings
	(3) Unidentified Processing	1 Unit with 1 row of 3 process columns, 2 possible treatment tanks/vessels, 2 probable air coolers, 1 pump building and 1 compressor building
	(4) Unidentified Combination	1 Unit with 1 row of 3 columns, 1 cluster of u/i equipment, 2 pipe furnaces, 1 process building and 1 control building 1 Unit with 2 columns, 1 pipe furnace and 1 process building with 7 accumulators on the roof 1 Pump and control building
	(5) Unidentified Processing	1 Double unit, each with 3 columns and 1 process and control building; 1 pump/compressor building in common 1 Row of 4 columns (extractors/absorbers) with 3 associated horizontal tanks (9 meters long) 1 Compressor building 9 Miscellaneous buildings 1 Transformer substation with 1 building 2 Horizontal storage tanks, 18 meters long
Q	Sulfuric Acid Plant	Facilities shown in Figure 3, but not enumerated
R	Crude Oil Distillation	
	(1) Desalting	1 Unit with 1 process/pump building and 5 settling and treating drums (two 15 meters long and three 12 meters long) 1 Unit with 1 process/pump building and 4 settling and treating drums (two 12 meters long and two 9 meters long) 1 Unit with 1 process/pump building and 2 settling and treating drums (12 meters long) 1 Support building
	(2) Distillation	6 Columns (1 vacuum, 2 atmospheric and 3 stabilizers/strippers) 1 Pipe furnace 3 Banks of heat exchangers 1 Air cooler 2 Pump buildings 6 Support buildings 1 Cylindrical storage tank, [redacted] 25X1 7 Horizontal storage/treating drums, [redacted] 25X1

Area	Functional Description	Equipment and Facilities
S	Gas Fractionating and Processing	1 Unit with 1 row of 5 columns (possible extractors), 3 possible absorbers, 1 process building, 1 compressor building, 1 support building, 2 cylindrical tanks (3 meters in diameter) and 7 horizontal tanks (one 12 meters long, [redacted] and four 25X1 meters long) 1 Unit with 2 possible fractionators, 2 possible absorbers, 1 furnace, 1 bank of heat exchangers, 1 pump building, 3 support buildings, 1 cylindrical storage tank [redacted] 25X1 horizontal tanks (12 meters long) and 4 possible horizontal tanks (not measured) 1 Support building 1 Cylindrical storage tank, [redacted] 25X1
T	Combination Crude Oil Distillation and Thermal Cracking	1 Distillation section with 1 row of 5 columns (1 atmospheric, 1 possible vacuum and 3 strippers/stabilizers), 1 pipe furnace, 1 bank of heat exchangers, 1 air cooler, 1 pump building, 2 support buildings, and 1 horizontal storage or treating drum (12 meters long) 1 Cracking section with 1 row of 4 columns (1 flasher, 2 reactors and 1 fractionator), 1 separator column, 2 pipe furnaces, 1 air cooler, 1 bank of heat exchangers, 1 pump building, and a vapor recovery section with 1 probable absorber column, 1 process building, 1 compressor building, 1 possible air cooler, 2 cylindrical tanks [redacted] 25X1 and 5 horizontal storage tanks (one 12 meters long, two 9 meters long and two 6 meters long) 2 Miscellaneous support buildings
U	Water Treatment and Cooling	28 Miscellaneous storage and support buildings 2 Cooling towers 1 with 3 cells 1 with 12 cells 10 Cylindrical storage tanks 2 12-meter-diameter 2 [redacted] 25X1 6 6-meter-diameter 5 Horizontal storage tanks 1 9-meter-long 4 6-meter-long 3 Semiburied storage tanks (not measured) 4 Covered water storage reservoirs 6 Open water treatment and storage basins

25X1

Area	Functional Description	Equipment and Facilities
V	Crude Oil Distillation	
	(1) Distillation	1 Unit with 1 row of 4 columns (fractionators and strippers), 2 probable stabilizing columns, 4 absorber/extractor/fractionator columns, 2 pipe furnaces, 2 pump buildings, 8 miscellaneous support buildings and 2 horizontal treatment drums 25X1 25X1
	(2) Distillation	1 Unit with 1 row of 4 columns (fractionators and strippers), a possible vapor recovery section with 2 columns, 1 pipe furnace, 2 banks of heat exchangers, 1 pump building, 6 support buildings, 4 cylindrical tanks (two and two 25X1 3 meters in diameter) and 7 horizontal tanks (one 12 meters long, two 9 meters long and four 6 meters long)
	(3) Unidentified Processing	1 Unit with 2 columns, 2 pipe furnaces, 1 bank of heat exchangers, 1 control/process building, 1 pump building, 2 cylindrical tanks (3 meters in diameter) and 1 horizontal tank (9 meters long) 4 Cylindrical storage tanks, 12 meters in diameter
	(4) Distillation	1 Unit with 1 row of 6 columns (1 vacuum, 2 atmospheric and 3 stripping/stabilizing columns), 1 pipe furnace, 1 bank of heat exchangers, 1 pump building, 4 support buildings, 2 cylindrical tanks (3 meters in diameter) and 5 horizontal tanks (two 12 meters long, two 9 meters long and one 6 meters long) 2 Support buildings
W	Water Cooling	5 Miscellaneous buildings 2 Cooling towers 1 with 7 cells 1 with 10 cells 1 Transformer substation with 1 building 2 Water treatment and storage reservoirs 1 Blow-down stack and basin
X	Administration and Support	42 Miscellaneous administration, support, storage and maintenance buildings

Documents

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